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I have fixed the composition of dimethylamine by the analysis of the platinum-salt and gold-salt. The former is one of the finest salts which I have ever examined, crystallizing in long splendid needles, shooting through the liquid from one side of the vessel to the other. It contains

$$C_2 H_8 N Pt Cl_3 = [(C H_3)_2 H_2 N] Cl, Pt Cl_2.$$

The gold-salt, which likewise crystallizes very well, has an analogous composition, viz.

$$C_2 H_8 N Au Cl_4 = [(CH_3)_2 H_2 N] Cl, Au Cl_3.$$

If the products obtained by distilling the sulphite of aldehyde-ammonia with lime had contained the minutest trace of dimethylamine, the formation of the beautiful characteristic platinum-salt would have revealed it. In none of the experiments did I observe the formation of this compound.

III. "Contributions towards the History of the Monamines.—No. VII. Transformation of Aniline into Benzoic Acid." By A. W. Hofmann, LL.D., F.R.S. Received December 3, 1862.

In a Note recently addressed to the Royal Society, I have described a new organic base which is formed of a secondary product in the manufacture of aniline upon a large scale. This substance, paraniline,

$$C_{12} H_{14} N_2,$$

is isomeric with aniline, and owes its origin evidently to the action of heat, under circumstances not yet precisely determined, upon that body. I have not yet succeeded in producing this compound from aniline, but the experiments made with the view of accomplishing this transformation have led me to an observation which I beg leave to mention briefly to the Royal Society. The vapour of aniline, when passed through a red-hot glass tube, undergoes decomposition; the tube becomes coated with a film of carbon, a brown liquid collects in the receiver, and a colourless gas burning with a luminous flame is evolved; if this be allowed to pass through water, the latter becomes charged with a considerable amount of cyanide of ammonium.

The brown distillate contains a large proportion of aniline which has escaped decomposition, and which may be readily separated by treatment of the distillate with an acid. On rectifying the portion of the oil which is insoluble in acid, the thermometer becomes stationary at 80°, when a colourless transparent liquid distils, possessing all the properties of benzol; it was identified, moreover, by transformation into nitrobenzol and aniline. The thermometer then rapidly rises, becoming stationary again at between 190° and 195°; a limpid oil lighter than water passes over, which by its odour is at once recognized as benzonitrile*. To remove every doubt, this oil was boiled with an alcoholic solution of potash, when torrents of ammonia were evolved, benzoate of potassium remaining as a residue. The benzoic acid was separated from the salt by addition of hydrochloric acid, and converted into the silver-salt, which was identified by analysis.

The formation, under these circumstances, of benzonitrile is probably due to a reaction at a higher temperature between aniline and the hydrocyanic acid generated during the destruction of another portion of this substance,

$$C_6 H_7 N + H C N = C_7 H_5 N + H_3 N.$$

The action of heat upon aniline gives rise, in addition, to the formation of small quantities of a crystalline indifferent substance, and an oily base boiling at a very high temperature; the nature of both these substances I have not yet determined.

The transformation of aniline into benzonitrile is thus seen to be far from elegant; and if it have any claims to notice, it is merely because there are at present comparatively few reactions known which permit a passage from a hydrocarbon, $Cn H_2n-6$, to an acid,

$$Cn+1 H_2n-6 O_2.$$

This transformation may possibly be used for the production of several of the higher terms of the series of aromatic acids which have not yet been obtained.

* I have lately had an opportunity of observing that benzonitrile solidifies in a mixture of solid carbonic acid and ether. The beautifully crystalline mass fuses again at −17°.